

ASSOCIATION BETWEEN THE MALLOPHAGA AND THE HIPPOBOSCIDAE INFESTING BIRDS.

BY

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While studying the Mallophaga of the birds of the Punjab, the author came across the following two examples of phoresy between the Mallophaga and the Hippoboscidae:—

1. *Columbicola columbae* (L.): Mallophaga, was carried by *Pseudolynchia canariensis* (Macq.): Hippoboscidae, collected from the Indian Rock Pigeon (*Columba livia intermedia* Str.: Columbidae).

2. *Philoferus* sp.: Mallophaga, was carried by *Ornithoea* sp.: Hippoboscidae, collected from the Bank Myna (*Acridotheres ginginianus* (Lath.): Sturnidae).

Ewing (1927) summarised the records of phoresy between these two groups of insects. This information has been completed upto 1937 in the present paper. It is unfortunate that in several instances full information is not available. Either the Mallophaga remained unidentified or the Hippoboscid was not determined. This detracts considerably from the already too meagre information available. The phenomenon is of such interest that it deserves a careful and extensive study.

There are only 18 instances on record in which complete information regarding the bird-lice, bird-fly and the bird-host is available.

Statement 1 gives the available records. Other necessary particulars have also been included in the statement. This analysis of the available records will help to clear the position, and attention is invited to the following points:—

(a) In most cases the bird-lice carried are the true parasites of the bird from which the Hippoboscid flies were collected.

(b) In five instances the bird-lice belong to a bird-host different from the bird from which the Hippoboscid flies were collected, but these birds are closely related to the bird-host of the lice and the commonness of the Mallophaga on the fly-hosts is a possibility.

Martin (1934) records *Columbicola columbae* (L.) being carried by *Pseudolynchia canariensis* (Macq.) from *Columba livia* Gmelin, from the U.S.A. Adie's (1915) record from India may represent the same association, as two out of three elements are common, viz., the Hippoboscid and the bird-host. The present record agrees with Martin's record in every detail, and it is interesting that in regions so wide apart instances of identical associations occur.

Regarding *Philoferus* sp. being carried by *Ornithoea* sp., there is no definite previous record. There are records of *Philoferus* sp.

and *P. sturni* (Schrank) being carried by *Ornithomyia fringillina* Curtis and one record of *Philopterus* sp. being carried by *Lynchia* sp.

There is a single record of *Ornithoea pusilla* Schin carrying an undetermined species of bird-louse, from *Eucichla cyanura* Bodd. from Batavia.

Mallophaga	Host from which Hippoboscid was collected	Recorded host of the Mallophagan sp.
1. <i>Degeeriella rotundata</i> (Os b.) (McAtee-1922)	<i>Corvus brachyrhynchos hesperis</i> : Corvidae	<i>C. americanus</i> : Corvidae
2. <i>Degeeriella deficiens</i> (P.) .. (Spencer 1928)	<i>Cyanocitta s. stelleri</i> : Corvidae	<i>Cyanopica cooki</i> : Corvidae
3. <i>Degeeriella interposita</i> ¹ (Kell) (Ewing 1927)	<i>Melospiza m. melodia</i> : Fringillidae	<i>Geospiza fuliginosa</i> , <i>Geospiza fortis</i> and <i>Camarhynchus variegatus</i> : Fringillidae
4. do. (Thompson 1937)	<i>Hylocichla u. ustulata</i> : Turdidae	<i>Dendroica bryanti</i> : Mniotiltidae
5. do. (Ewing 1927)	<i>Dumetella carolinensis</i> : Mimidae	<i>Nesomimus parvulus</i> and <i>Nesomimus carringtoni</i> : Mimidae

The commonest instances of phoresy are *Degeeriella* species being carried from different bird-hosts by *Ornithomyia fringillina* Curtis and *O. avicularia* L.

A species of *Degeeriella* is recorded as being carried by *Ornithoea metallica* (Sch.).

The only other species recorded is *Ardeicola botauri* (Os.) carried by *Lynchia botaurinorum* (Swenk.).

As to the significance of this 'association' the following suggestions have been made by Ewing (1927):—

1. The Mallophaga attempt to obtain blood that the flies themselves have imbibed from the birds.

2. The Mallophaga are perhaps attracted by the higher body temperature of the fly on a dead bird.

3. The Mallophaga are attracted by some odoriferous secretion of the flies.

4. The Mallophaga use the flies as transport agency from one individual or species of birds to another and from a dying or dead host to a living one.

Considering these four suggestions more closely, we find that the first three do not hold.

1. The Mallophaga subsist on feathers, scurf, scales and other epidermal products. It is only in cases of wounds or bruises on

¹ 'It is of interest to note the marked commonness of parasitic species to the genera *Geospiza* and *Camarhynchus*, thus lending weight to the belief of their very close relationship.'—Kellogg, V. L. & Kuwana, S.I., 1902, *Proc. Wash. Acad. Sci.*, iv, p. 450.

the host that they feed on blood. Therefore, the suggestion that the lice obtain blood from the flies, cannot be upheld.

2. The Hippoboscid flies are known to leave the defunct host almost immediately after its death while the Ischnocern Mallophaga do not, as a rule, leave it, rather die *in situ*. If ever they deviate from their usual habit they may do so only after the temperature of the dead body has decidedly gone down and that too for favourably warm places on the host's body.

In the case of crows, the lice were seen to swarm about the head region two to three hours after the death of the bird. They were apparently so panic stricken that they moved in and out the feathery covering for likely favourable spots, persistently biting the feathers here and there and attaching themselves by their strong sharp-edged mandibles to the fragments coming in their way. But they did not quit the body at all. From this it may be inferred that lice will fasten upon Hippoboscid fly, if the latter comes in the way, but not purposely for reason of the higher temperature of the fly.

3. An examination of the specimens of the bird-flies in the collection at the Punjab Agricultural College and Research Institute, Lyallpur, and the collection at the Imperial Agricultural Research Institute, New Delhi, was carried out. Forty-three specimens of *Ornithomyia comosa* Aust. from the Indian Sand Martin, twenty-one specimens of *Lynchia maura* Big. [= *Pseudolynchia canariensis* (Macq.)] from the Indian Pigeons collected from Mandalay, Calcutta, Pusa, Rawalpindi and Kasauli, and numerous unidentified Hippoboscidae from various birds were examined. Not a single example of such an association was obtained from these specimens. Thompson (1935) examined about 150 bird-flies of various species from the British Isles and Uganda, and failed to find a single instance of this relationship. If the Hippoboscidae secreted an odour attractive to the Mallophaga, the instances of association between the two bird-parasites would have been of more frequent occurrence. Therefore, the theory of attraction by the bird-fly odour does not seem probable.

4. We now consider the last suggestion, viz., that the Mallophaga use the Hippoboscidae as a transport agency from the dying or dead host to a living host, or from one individual or species to another, or in other words as a means of intra or inter-specific dispersal. It is true that the Hippoboscidae are highly specialized Cyclorrhapidae, provided with well developed, toothed or spined claws for clinging to the hosts, and possess mouth-parts for piercing and sucking the blood of the host on which alone they can subsist. They do not ordinarily leave the host until the latter dies (Thompson 1937a). However, host specificity is not a marked feature of the Hippoboscidae. Most species have a wide range of hosts and extensive geographical distribution.

Ornithomyia avicularia L. and *Ornithomyia fringillina* Curtis, the two commonest fly-partners of this association, are found on a variety of birds, such as the ravens, jays, sparrows, skylarks (Passeriformes); wood-peckers, owls (Coraciiformes); hawks

STATEMENT I
RECORDED INSTANCES OF PHORESY BETWEEN MALLOPHAGA AND HIPPOBOSCIDAE

Year	Author	No.	Mallophaga (Ischnocera)	Attached to	Hippoboscids	Bird host	Country
1857	Aube	2	Species not named	Abdomen	<i>Ornithomyia (avicularia) ?</i>	Magpie [<i>Pica p. pica</i> (L.): Corvidae]	France
1890	Sharp	several	Species not named	--	<i>Ornithomyia avicularia</i> L.	Host not named (taken on wing)	England
1910	Warnach	1	<i>Philopterus</i> sp.	Abdomen	<i>Ornithomyia fringillina</i>	Blackbird (<i>Planesticus m. nerula</i> L.: Turridae)	Germany
1910	Mjoberg	3	<i>Philopterus sturni</i> (Schränk)*	Abdominal hairs	<i>Ornithomyia fringillina</i>	<i>Sturnus v. vulgaris</i> L.: Sturnidae	Germany
		7	<i>Philopterus sturni</i> (Schränk)*	Abdominal hairs	<i>Ornithomyia fringillina</i>	<i>Sturnus v. vulgaris</i> L.: Sturnidae	Germany
1911	Jacobson	1	Species not named	Clasped between legs	<i>Ornithoea pusilla</i> Schin.	<i>Eucitha cyanura</i> Bodd.: Turridae	Batavia, Java
1912	Forsius	1	<i>Degeriella canerata</i> (N.)*	Wing base	<i>Ornithomyia avicularia</i> L.	<i>Tetrao tetrix</i> : Phasianidae	Finland
		2	<i>Degeriella uncinosa</i> (N.)*	Tibia and abdomen	" "	Carion Crow (<i>Corvus corix</i> L. Corvidae)	Finland
1913	Harrison	1	<i>Degeriella hectica</i> (N.)*	Abdominal hairs	<i>Ornithomyia</i> sp.	Regent Bird [<i>Sericulus chryscephalus</i> (Lew.): Ptilonorynchidae]	N.S. Wales
		16	<i>Degeriella</i> sp.	Dorsal abdominal hairs	<i>Ornithomyia</i> sp.	Grey Magpie [<i>Strepera versicolor</i> (Lath.) Cracticidae]	N.S. Wales
1915	Adie	1	Species not named	Wing joint	<i>Pseudolynchia canariensis</i> (Macq.)	<i>Columba livia</i> Gmelin: Columbidae	India
1920	Banks	2	<i>Degeriella</i> sp.	Abdominal tip	<i>Ornithomyia fringillina</i> Curtis	Canada Jay [<i>Perisoreus canadensis</i> (L.): Corvidae]	England

Year	Author	Host	Abdominal tergites	Ornithomyia	Host not named	Canada
1922	McAtee	<i>Degeriella rotundata</i> (Osb.)	"	<i>Ornithomyia</i> Curtis	Western Crow (<i>Corvus brachyrhynchos hesperis</i> ; Corvidae)	U.S.A.
		"	"	<i>Ornithomyia</i> Curtis	Jay (<i>Perisoreus barbouri</i> ; Corvidae)	Canada
1922	Johnson	Species not named	Abdomen	<i>Ornithomyia avicularia</i> L.	Cat Bird (<i>Dumetella carolinensis</i> ; Mimidae)	Ohio (U.S.A.)
1927	Ewing	<i>Degeriella</i> (Kell.)*	Postero-lateral abdomen	<i>Ornithomyia</i> Curtis	<i>Melospiza m. melodia</i> ; Fringillidae	Ohio (U.S.A.)
1928	Warburton	<i>Degeriella</i> (Kell.)*	"	<i>Ornithomyia</i> Curtis	Window (? <i>Planesticus merula</i> L.; Turdidae)	Cambridge
"	Spencer	<i>Degeriella marginalis</i> (N.)*	Abdominal hairs	<i>Ornithomyia</i> Curtis	Stellar Jay (<i>Cyanocitta s. stelleri</i> ; Corvidae)	South America
1933	Thompson	<i>Degeriella deficiens</i> (P.)*	Abdominal sternite	<i>Ornithomyia avicularia</i> L.	Song Thrush (<i>Turdus e. ericetorum</i> T.; Turdidae)	England
		<i>Degeriella marginalis</i> (N.)*	Posterior abdomen	"	Window	Surrey (England)
1934	Martin	"	"	"	"	U.S.A.
		"	"	"	"	U.S.A.
1934	Martin	<i>Columbicola columbae</i> (L.)*	Carrying between legs	<i>Pseudolynchia</i> (Macq.)	<i>Columba livia</i> Gmelin; Columbidae	U.S.A.
		"	"	"	"	U.S.A.
1935	Thompson	<i>Philopterus sturni</i> (Schränk)*	Posterior abdomen	<i>Pseudolynchia</i> (Macq.)	<i>Columba livia</i> Gmelin; Columbidae	U.S.A.
		"	"	"	"	England
1935	Thompson	<i>Philopterus sturni</i> (Schränk)*	"	<i>Ornithomyia</i> Curtis	Starling (<i>Sturnus vulgaris</i> L.; Sturnidae)	England
		"	"	"	"	England
1935	Thompson	<i>Degeriella marginalis</i> (N.)*	"	<i>Ornithomyia</i> Curtis	Starling (<i>Sturnus vulgaris</i> L.; Sturnidae)	England
		"	"	"	Window	England
1935	Thompson	<i>Philopterus</i> sp.	Abdomen	<i>Lynchia</i> sp.	<i>Pyronelana orix nigri-rons</i> Bohm.; Ploceidae	Belgium
1935	Peters	<i>Degeriella marginalis</i> (N.)*	"	<i>Ornithomyia</i> Curtis	<i>Arceuthornis pilaris</i> (L.) Turridae	Congo Sweden

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STATEMENT I

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Year	Author	No.	Mallophaga (Ischnocera)	Attached to	Hippoboscoid	Bird host	Country
1857	Aube	2	Species not named	Abdomen	<i>Ornithomyia</i> (avicularia ?)	Magpie [<i>Pica p. pica</i> (L.): Corvidae]	France
1890	Sharp	several	Species not named	--	<i>Ornithomyia avicularia</i> L.	Host not named (taken on wing)	England
1910	Warnach	1	<i>Philopterus</i> sp.	Abdomen	<i>Ornithomyia fringillina</i> Curtis	Blackbird (<i>Planesticus m. merula</i> L.: Turdidae)	Germany
1910	Mjöberg	3	<i>Philopterus sturni</i> (Schränk)*	Abdominal hairs	<i>Ornithomyia fringillina</i> Curtis	<i>Sturnus v. vulgaris</i> L.: Sturnidae	Germany
		7	<i>Philopterus sturni</i> (Schränk)*	Abdominal hairs	<i>Ornithomyia fringillina</i> Curtis	<i>Sturnus v. vulgaris</i> L.: Sturnidae	Germany
1911	Jacobson	1	Species not named	Clasped between legs	<i>Ornithoeca pusilla</i> Schin.	<i>Eucichla cyanura</i> Bodd.: Turdidae	Batavia, Java
1912	Forsius	1	<i>Degeeriella camerata</i> (N.)*	Wing base	<i>Ornithomyia avicularia</i> L.	<i>Tetraoetrix</i> : Phasianidae	Finland
		2	<i>Degeeriella uncinosa</i> (N.)*	Tibia and abdomen	" "	Carion Crow (<i>Corvus cornix</i> L. Corvidae)	Finland
1913	Harrison	1	<i>Degeeriella hectica</i> (N.)*	Abdominal hairs	<i>Ornithomyia</i> sp.	Regent Bird [<i>Sericulus chryscephalus</i> (Lew.): Ptilonrhynchidae]	N.S. Wales
		16	<i>Degeeriella</i> sp.	Dorsal abdominal hairs	<i>Ornithomyia</i> sp.	Grey Magpie [<i>Strepera versicolor</i> (Lath.) Cracticidae]	N.S. Wales
1915	Adie	1	Species not named	Wing joint	<i>Pseudolynchia canariensis</i> (Macq.)	<i>Columba livia</i> Gmelin: Columbidae	India
1920	Banks	2	<i>Degeeriella</i> sp.	Abdominal tip	<i>Ornithomyia fringillina</i> Curtis	Canada Jay [<i>Perisoreus canadensis</i> (L.): Corvidae]	England
1922	McAtee	1	<i>Degeeriella rotundata</i> (Osb.)	Abdominal tergites	<i>Ornithomyia fringillina</i> Curtis	Host not named	Canada
		1	" "	" "	<i>Ornithomyia fringillina</i> Curtis	Western Crow (<i>Corvus brachyrhynchos hesperis</i> : Corvidae)	U.S.A.
1922	Johnson	2	Species not named	Abdomen	<i>Ornithomyia avicularia</i> L.	Jay (<i>Perisoreus barbouri</i> : Corvidae)	Canada
1927	Ewing	1	<i>Degeeriella interposita</i> (Kell.)*	Postero-lateral abdomen	<i>Ornithomyia fringillina</i> Curtis	Cat Bird (<i>Dumetella carolinensis</i> : Mimidae)	Ohio (U.S.A.)
		2	<i>Degeeriella interposita</i> (Kell.)*	" "	<i>Ornithomyia fringillina</i> Curtis	<i>Melospiza m. melodia</i> : Fringillidae	Ohio (U.S.A.)
1928	Warburton	12	<i>Degeeriella marginalis</i> (N.)	Abdominal hairs	<i>Ornithomyia fringillina</i> Curtis	Window (? <i>Planesticus merula</i> L.: Turdidae)	Cambridge
"	Spencer	16	<i>Degeeriella deficiens</i> (P.)*	Abdominal sternite	<i>Ornithomyia avicularia</i> L.	Stellar Jay (<i>Cyanocitta s. stelleri</i> : Corvidae)	South America
1933	Thompson	3	<i>Degeeriella marginalis</i> (N.)*	Posterior abdomen	" "	Song Thrush (<i>Turdus e. cricetorum</i> T.: Turdidae)	England
		11	" "	" "	" "	Window	Surrey (England)
1934	Martin	3	<i>Columbicola columbae</i> (L.)*	Carrying between legs	<i>Pseudolynchia canariensis</i> (Macq.)	<i>Columba livia</i> Gmelin: Columbidae	U.S.A.
		1	" "	" "	<i>Pseudolynchia canariensis</i> (Macq.)	<i>Columba livia</i> Gmelin: Columbidae	U.S.A.
1935	Thompson	1	<i>Philopterus sturni</i> (Schränk)*	Posterior abdomen	<i>Ornithomyia fringillina</i> Curtis	Starling (<i>Sturnus v. vulgaris</i> L.: Sturnidae)	England
		1	<i>Philopterus sturni</i> (Schränk)*	" "	<i>Ornithomyia fringillina</i> Curtis	Starling (<i>Sturnus v. vulgaris</i> L.: Sturnidae)	England
		1	<i>Degeeriella marginalis</i> (N.)	" "	<i>Ornithomyia fringillina</i> Curtis	Window	England
1935	Thompson	1	<i>Philopterus</i> sp.	Abdomen	<i>Lynchia</i> sp.	<i>Pyromelana orix nigritrons</i> Bohm.: Ploceidae	Belgium
		2	<i>Degeeriella marginalis</i> (N.)*	"	<i>Ornithomyia fringillina</i> Curtis	<i>Arreuthornis pilaris</i> (L.): Turdidae	Congo Sweden
1935	Peters		Publication not available to me in original				

STATEMENT I—(Continued)

RECORDED INSTANCES OF PHORESY BETWEEN MALLOPHAGA AND HIPPOBOSCIDAE

Year	Author	No.	Mallophaga (Ischnocera)	Attached to	Hippoboscid	Bird host	Country
1936	Thompson	1	<i>Degeeriella</i> (?) Lost	Abdomen	<i>Ornithoza metallica</i> (Sch.)	Kingfisher [<i>Halcyon juliae</i> (Heine)]: Alcedinidae]	New Hebrides
		5	<i>Ardeicola batauri</i> (Osb.).	"	<i>Lynchia</i> (Swenk)	On wing [? <i>Botaurus lentiginosus</i> (Montagu), Ardeidae]	Mexico (U.S.A.)
		2	<i>Degeeriella</i> sp.	"	<i>Ornithoza metallica</i> (Sch.)	Flycatcher	Queensland (Australia)
		4	<i>Degeeriella marginalis</i> (N)*	Abdominal tergites	<i>Ornithomyia</i> Curtis	Blackbird (<i>Planesticus m. merula</i> : Turdidae)	Scotland
		2	<i>Degeeriella</i> sp.	Abdominal tip	<i>Ornithomyia</i> Curtis	Eastern Song Sparrow [<i>Melospiza m. melodia</i> (Wilson): Fringillidae]	U.S.A.
		2	<i>Degeeriella simplex</i> (Kell.)*	Abdominal tergites	<i>Ornithomyia</i> Curtis	<i>Turdus migratorius</i> L. Turdidae	U.S.A.
1937	Thompson	2	<i>Degeeriella</i> sp.	Abdomen	<i>Ornithomyia</i> Curtis	Canada Jay [<i>Perisoreus canadensis</i> (L.): Corvidae]	Anticosti Island
		5	<i>Degeeriella</i> (<i>Kell.</i>)*	Attached to body	<i>Ornithomyia</i> Curtis	Russet-backed Thrush [<i>Hylocichla u. ustulata</i> (Nutt.): Turdidae]	Br. Columbia
		1	<i>Degeeriella</i> sp.	Abdomen	<i>Ornithomyia</i> Curtis	Olive-backed Thrush [<i>H. ulabalatus swainsoni</i> (T.): Turdidae]	New Foundland

*Instances of complete information.